

the catheter with the pusher wire, and expelling the stent from the catheter at the target site, with stent radial expansion at the target site being effective to release the stent from the pusher wire and wherein the ribbon, when stretched out, is straight.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version with markings to show changes made."

REMARKS

The following is responsive to the final official action mailed November 22, 2002. Each issue is discussed in detail below. The present amendment is being filed a part of an RCE.

Rejections under §112

Claim 8 was rejected under 35 USC §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Specifically, it is asserted that, in line 1, "the helical ribbon" lacks antecedent basis.

In response, claim 8 has been amended to remove the asserted indefinite nature.

Rejections under §102

Claim 1 was rejected under 35 USC §102(b) as being anticipated by Sawyer (US 5108417). It is asserted in the official action that Sawyer, in figure 3, in col. 4, lines 14-25, and in col. 5, lines 3-11, discloses the method of treating a lesion as claimed, where a stent inherently has a bending gradient due to a gradient of ribbon thickness.

Although the Applicant does not concur, claim 1 has been amended to further distinguish it over Sawyer. Withdrawal of the rejection is respectfully requested.

Rejections under §103

Claims 2-4 and 8 were rejected under 35 USC §103(a) as being unpatentable over Sawyer in view of Poncet (US 5833694).

As mentioned above, claim 1, on which claims 2-4 and 8 are dependent, has been amended to further distinguish from Sawyer. Therefore, Sawyer does not disclose the method substantially as claimed, as required for the rejection. Withdrawal of the rejection is respectfully requested.

Claims 1, 5 and 6 were rejected under 35 USC §103(a) as being unpatentable over Kropt (US 4760849) in view of Poncet.

Although the Applicant does not concur, claim 1 has been amended to further distinguish it over the cited combination. Among other reasons, Kropt does not disclose a stent made from a coiled ribbon, wherein the stent has a "non-zero pitch" along the length of the stent. Such an amendment is clearly supported in the figures.

The coil spring in Kropt is used as a filter for thromboses (col. 1, line 62). The blanks are bent in sections to form a coil, wherein, at its end, several overlapping turns are formed (col. 1, line 64, to col. 2, line 2), as shown in figure 2, forming a zero pitch (col. 1, lines 56-58). The coil shown in figure 5 is also described as having later sections having a pitch of zero (col. 4, lines 17-20). As such, the combination of cited references does not teach every element of the claimed invention. Withdrawal of the rejection is respectfully requested.

Allowable Subject Matter

It is acknowledged that claim 7 would be allowable if rewritten in independent form. However, due to the amendments to the claim, Applicant believes that the suggested amendment to claim 7 is not necessary.

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Filed: April 13, 2000
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Added claims

Claim 9-14 have been added and are believed to be allowable.

Applicant believes the claims to be in condition for allowance. Early and favorable action thereon is requested. If there are further issues to discuss, the Examiner is urged to contact the undersigned at 952-563-3008.

Respectfully submitted,

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Version with markings to show changes made

In the claims:

Please amend the claims as follows:

1. (Amended twice) A method of treating a lesion at a neurovascular target vessel site, comprising

guiding a neuro-interventional catheter to the target site,

advancing through the catheter, a stent adapted for advancement through a catheter in an upstream to downstream direction to the target site in a contracted stent condition, and with expulsion from the catheter, downstream end first, and radial expansion at the target site, to engage the walls of the vessel,

said stent being formed of a coiled ribbon, the stent having a non-zero pitch along its length, being self-expanding and having a bending-stiffness gradient along its length due to one or more of the following:

(i) a gradient of ribbon width;

(ii) a gradient of ribbon thickness;

(iii) a gradient of size or number of openings formed in the stent ribbon, and

expelling the stent from the catheter at the target site, causing the stent to expand radially against the vessel walls at the target site,

wherein said guiding includes engaging a pusher wire with the stent, pushing the stent through the catheter with the pusher wire, and expelling the stent from the catheter at the target site, with stent radial expansion at the target site being effective to release the stent from the pusher wire.

2. (Amended) The method of claim 1, wherein the pusher wire engages the downstream end of the stent ~~said guiding includes engaging a pusher wire with the stent, pushing the stent through the catheter with the pusher wire, and expelling the stent from the catheter at the target site, with stent radial expansion at the target site being effective to release the stent from the pusher wire.~~

3. (Previously amended) The method of claim 2, wherein the stent is releasably attached to the pusher wire, for release therefrom, when the stent is released and extends to its expanded

condition.

4. (Amended) The method of claim 1, wherein the stent has a contracted-condition diameter of between about 10 and 30 mils, and a diameter in a fully expanded condition of between 40 and 125 mils.

5. (Previously amended) The method of claim 1, wherein the stiffness gradient in the stent is due to a gradient of ribbon width, lesser ribbon width at the upstream end of the stent, and greater ribbon width at the downstream end of the stent, where the greater ribbon width is (i) at least ten times the ribbon thickness and (ii) at least two times the lesser width,

said greater ribbon width being effective to reduce the rate of expansion of the stent from its contracted to its radially extended condition, relative to that of a stent having uniform winding widths equal to the lesser ribbon widths,

said lesser ribbon width being effective to increase the angle of catheter bend through which the catheter can be advanced, in an upstream to downstream direction, relative to that of a stent having uniform winding widths equal to the greater ribbon width.

6. (Unchanged) The method of claim 5, wherein the stent ribbon thickness is between is 0.5 and 2 mils, the greater ribbon width is between 25 and 75 mils, and the lesser ribbon width is between 5 and 15 mils.

7. (Previously amended) The method of claim 1, wherein the stent openings are I-beam shaped openings whose "I" axis is aligned transversely to the longitudinal axis of the stent in the contracted state, or Z-shaped openings whose central axis is aligned transversely to the longitudinal axis of the stent in the contracted state.

8. (Amended twice) The method of claim 1, wherein the [helical] ribbon in helical form is effective to cover between 50% and 80% of the surface area of the vessel region containing the stent.

Please add the following claims:

9. (New) The method of claim 1, wherein the ribbon, when stretched out, is straight.

10. (New) The method of claim 2, wherein the pusher wire has an expanded portion which

engages the stent.

11. (New) The method of claim 2, wherein the downstream end of the stent is connected to a notch on the end of the pusher wire.

12. (New) The method of claim 1, wherein the stent does not deploy until it is free from the catheter.

13. (New) The method of claim 1, wherein the neurovascular target vessel site is a neurovascular aneurysm.

14. (New) A method of treating a lesion at a neurovascular target vessel site, comprising
guiding a neuro-interventional catheter to the target site,
advancing through the catheter, a stent adapted for advancement through a catheter in an upstream to downstream direction to the target site in a contracted stent condition, and with expulsion from the catheter, downstream end first, and radial expansion at the target site, to engage the walls of the vessel,

said stent being formed of a coiled ribbon, being self-expanding and having a bending-stiffness gradient along its length due to one or more of the following:

(i) a gradient of ribbon width;

(ii) a gradient of ribbon thickness;

(iii) a gradient of size or number of openings formed in the stent ribbon, and

expelling the stent from the catheter at the target site, causing the stent to expand radially against the vessel walls at the target site,

wherein said guiding includes engaging a pusher wire with the stent, pushing the stent through the catheter with the pusher wire, and expelling the stent from the catheter at the target site, with stent radial expansion at the target site being effective to release the stent from the pusher wire and wherein the ribbon, when stretched out, is straight.

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Patrick Rivelli, Jr.
Application No.:	09/548683
Filed:	April 13, 2000
For:	Method for Treating Neurovascular Aneurysms
Examiner:	Julian W. Woo
Group Art Unit:	3731

Assistant Commissioner for Patents
Washington, D.C. 20231

Docket No.: S63.2P-10973-US02

ASSIGNEE'S STATEMENT OF OWNERSHIP 37 CFR 3.73(B)

Smart Therapeutics, Inc., a Delaware corporation is the assignee of the entire right, title and interest in the patent application identified above by virtue of:

A. ☐ An assignment from the inventor(s) of the patent application identified above. A photocopy of the Assignment is enclosed. The original Assignment is being mailed to Assignment Branch for recording.

OR

B. ☒ A chain of title from the inventor(s), of the patent application identified above, to the current assignee as shown below:

1. From : Patrick Rivelli, Jr. To: Smart Therapeutics, Inc.
The document was recorded in the Patent and Trademark Office at Reel 011036, Frame 0992, or for which a copy thereof is attached.

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☐ Additional documents in the chain of title are listed on a supplemental sheet.

☐ Copies of assignments or other documents in the chain of title are attached.

The undersigned is empowered to sign this statement of ownership certificate on behalf of the assignee.

Respectfully submitted,

VIDAS, ARRETT & STEINKRAUS

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